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battery; the whole being properly connected with an exceedingly delicate galvanometer. On making the apparatus revolve rapidly, not the slightest deflection of the needle was perceptible. Hence, if so large a surface of hot water be incapable of conducting as much electricity as would agitate the most delicate astatic needle, though the exciting cause was sufficient to make a wire revolve round a magnet, and overcome the resistance of the mercury through which it was dragged, it would require an enormous power of this kind to *decompose* water. The author, therefore, considers it unlikely that electricity induced by magnets will ever supply the place of the voltaic battery in effecting chemical decomposition; and he concludes by observing, that "as no increase of electro-magnetic power is gained by increasing the *decomposing* powers of a battery, and as action and reaction are equal, it appears improbable that we shall ever obtain high decomposing powers by any increase in magneto-electric induction."

A paper was then read, entitled, "Notice of the Remains of the recent Volcano in the Mediterranean." By John Davy, M.D. F.R.S. Assistant Inspector of Army Hospitals.

The author communicates an account given by Captain Swinburne, dated the 24th of August, of a dangerous shoal, in latitude  $37^{\circ} 9' N$ . and longitude  $12^{\circ} 43' E$ , consisting principally of black sand and stones, with a circular patch of rock, which has been left by the volcano that lately appeared in the Mediterranean. Captain Swinburne furnished the author with two specimens of the air which was seen rising from the site of the volcano, in small silver threads of bubbles. These were found, upon examination by chemical tests, to consist of between 9 and 10 parts of oxygenous to 79 or 80 of azotic gases.

The author adduces arguments in favour of the supposition that this air is disengaged from sea water at the bottom in contact with the loose and probably hot ashes and cinders composing the shoal, rather than that it arises from the extinct volcano. He is also disposed to extend this theory to the explanation of the gases disengaged from hot springs, which are generally found to consist of a mixture of oxygenous and azotic gases, the former being in less proportion than in atmospheric air, in consequence of its abstraction by oxidating processes from the air originally contained in these waters.

The Society then adjourned over the Easter vacation, to meet again on the 18th of April.

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April 18, 1833.

FRANCIS BAILY, Esq., Vice-President, in the Chair.

Thomas Botfield, Esq.; Sir William Burnett, Knt. K.C.H.; Major F. H. Shadwell Clerke, K.H.; Robert Adam Dundas, Esq.; the Rev. Augustus Page Saunders, M.A.; and Thomas Stephens Davies, Esq., were elected Fellows of the Society.

A paper was read, entitled, "On Improvements in the Instruments

and Methods employed in determining the Direction and Intensity of Terrestrial Magnetism." By Samuel Hunter Christie, Esq. M.A. F.R.S.

The tedious nature of the observations by which the direction and intensity of the terrestrial magnetic force are determined, and the uncertainty attending the results when obtained, have long been a subject of regret to all who are engaged in the investigation of the phenomena of terrestrial magnetism. Sensible of this, the author's attention has at different times been turned to the improvement of the instruments employed for these purposes; and in this communication he proposes methods by which he considers that these instruments might be so improved that the results should be obtained with greater facility and also with greater certainty. The uncertainty attending the results obtained with the dipping needle, as at present constructed, arises principally from the two sources, friction upon the axis, and the want of coincidence of the needle's centre of gravity with the axis of motion; the latter rendering necessary the inversion of its poles. The author suggests a method by which he considers that, probably, the friction may be diminished; but he has principally directed his attention to obviate the necessity of the inversion of the poles.

In order to remove the practical difficulty attending the adjustment of the centre of gravity to the axis of motion, an operation in which the artist rarely, if ever, completely succeeds, the author proposes to dispense with this condition; and shows how the dip may then be determined, without the necessity of inverting the poles of the needle, the position of its centre of gravity having been determined previously to its being magnetized. The advantages attending the method proposed by the author are not, however, restricted to the determination of the dip with greater accuracy and greater facility: a further and still greater advantage attending the use of a dipping needle on the principle he proposes, is, that a measure of the terrestrial magnetic intensity will be obtained by the same observations which give the dip; so that, by this means, the observations usually required for that purpose, and which are of the most tedious nature, will be avoided. To effect both these objects in the most convenient manner, he proposes that the needle should be so constructed that its centre of gravity should be out of the axis of motion, in a line perpendicular to that axis and to the axis of the needle. The requisite formulæ for determining the dip and the measure of the terrestrial intensity, in this case and also when the centre of gravity is in any other position, are investigated in the paper. Mayer had previously pointed out that the dip might be determined by means of a needle having its centre of gravity out of the axis of motion, and had given the formulæ requisite for that purpose. His object, however, does not appear to have been the same as our author's,—the avoiding in all cases that source of inaccuracy, the inversion of the poles of the needle,—but simply the determination of the dip, whether the centre of gravity of the needle were made to coincide with the centre of motion, or not: the determination of a measure of the terrestrial intensity, by such means, does not appear to have entered into his contemplation.

As another form in which the same principles might be advantageously applied, the author proposes that two needles, similar in all

respects, should be placed on the same axis; and points out how, by means of such a compound needle, both the dip and intensity might be determined by independent methods, so that the agreement of the results would afford a test of the accuracy of the adjustments and of the observations. He considers that the knife-edge support, which has recently been adapted to a dipping needle, would be peculiarly applicable to a needle of this construction. The sensibility of such a needle would be much greater than that of any hitherto constructed, and the utmost delicacy would be required in the adjustments; but if the needle were accurately constructed, and due care were taken in the magnetizing, and in making the adjustments and observations, the author expects that the dip and intensity would be determined to a degree of certainty hitherto unattained.

The advantages proposed to be derived from the use of a dipping needle on the principle described in this paper, are, that as the dip would be obtained without inversion of the poles, the results would be less liable to error than when that operation is necessary, and the observations would be made in less than half the time usually required; and that a measure of the intensity of terrestrial magnetism would be obtained from the same observations which give the dip, the intensity of the force being thus always determined by means of the same needle, and at the same instant as its direction.

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April 25, 1833.

MARK ISAMBARD BRUNEL, Esq., Vice-President, in the Chair.

A paper was read, entitled, "An Account of an extraordinary luminous appearance in the Heavens, seen at Athboy in Ireland, on the 21st of March, 1833." By the Right Honourable the Earl of Darnley. Communicated by John George Children, Esq. Sec. R.S.

The noble author's house is situated in lat.  $53^{\circ} 37' N.$ , long.  $6^{\circ} 54' W.$  On the evening of the 21st of March last, at 9 p.m., a stream of luminous matter, reaching from the eastern to the western horizon, which it entered to the north of the constellation of Orion, was observed passing about midway between the Great Bear and Arcturus, and directly over the two principal stars of Gemini. The phenomenon was not accompanied by the usual flashings of an Aurora, but appeared to flow, when attentively observed, in a rapid stream from east to west, and varying in intensity in its course. His Lordship compares it to the stream from the pipe of an engine played over the head of a person standing under it, about the middle of its course.

The light was most brilliant at the eastern extremity of the arch, where it was about  $1^{\circ}$  wide, gradually increasing in width and diminishing in intensity as it approached the western extremity, where it may have occupied about  $5^{\circ}$  or  $6^{\circ}$ . Stars of the second and third magnitudes were distinctly visible through the arch, at least from the meridian to the western horizon; and though not apparently at a great elevation, light clouds occasionally seemed to pass between it